U.S. DEPARTMENT OF COMMERCE
National Technical Information Service

PB-269 838

Kanopolis Reservoir
Ellsworth County, Kansas

National Eutrophication Survey, Corvallis, Oreg

Prepared for

Corvallis Environmental Research Lab, Oreg

May 77

PB 269 838

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL EUTROPHICATION SURVEY
WORKING PAPER SERIES

CORVALLIS ENVIRONMENTAL RESEARCH LABORATORY - CORVALLIS, OREGON
and
ENVIRONMENTAL MONITORING & SUPPORT LABORATORY - LAS VEGAS, NEVADA

REPRODUCED BY
NATIONAL TECHNICAL
INFORMATION SERVICE
U. S. DEPARTMENT OF COMMERCE
SPRINGFIELD, VA. 22161

P.O. 668-660

REPORT
ON
KANOPOLIS RESERVOIR
ELLSWORTH COUNTY
KANSAS
EPA REGION VII
WORKING PAPER No. 516

WITH THE COOPERATION OF THE
KANSAS DEPARTMENT OF HEALTH AND ENVIRONMENT
AND THE
KANSAS NATIONAL GUARD
MAY, 1977

TECHNICAL REPORT DATA

(Please read Instructions on the reverse before completing)

1 REPORT NO	2
3 RECIPIENT'S ACCESSION NO	
4 TITLE AND SUBTITLE: Report on Kanopolis Reservoir, Ellsworth County, Kansas	5 REPORT DATE: Prepared May, 1977
	6 PERFORMING ORGANIZATION CODE
7 AUTHOR(S): Anonymous (National Eutrophication Survey Staff)	8 PERFORMING ORGANIZATION REPORT NO: Working Paper # 516
9 PERFORMING ORGANIZATION NAME AND ADDRESS: National Eutrophication Survey U.S. Environmental Protection Agency 200 S. W. 35th St. Corvallis, Oregon 97330	10 PROGRAM ELEMENT NO 11 CONTRACT/GRANT NO
12 SPONSORING AGENCY NAME AND ADDRESS: Office of Research and Development U.S. Environmental Protection Agency 401 M Street, S. W. Washington, DC 20460	13 TYPE OF REPORT AND PERIOD COVERED: Final - 1974 14 SPONSORING AGENCY CODE

15 SUPPLEMENTARY NOTES: Prepared in cooperation with the U.S. Environmental Protection Agency, National Environmental Research Center, Las Vegas, Nevada 89114

16 ABSTRACT

Annual total phosphorus and total nitrogen loadings to the lake were estimated and subdivided according to either point or non-point source origin. An assessment of the lake's trophic condition and limiting nutrient is also provided. All data collected by the U.S.E.P.A. National Eutrophication Survey during the one year study of the lake and its tributaries are included in the report.

17 KEY WORDS AND DOCUMENT ANALYSIS

a. DESCRIPTORS	b. IDENTIFIERS/OPEN ENDED TERMS	c. COSATI Field/Group
eutrophication lakes nutrients phosphorus nitrogen loading		08H 08C

18 DISTRIBUTION STATEMENT: Release unlimited	19 SECURITY CLASS (This Report)	21 NO. OF PAGES: 46
	20 SECURITY CLASS (This Page)	22 PRICE: PC A03 / MF A01

EPA Form 2220-1 (9-73)

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FOREWORD

The National Eutrophication Survey was initiated in 1972 in response to an Administration commitment to investigate the nationwide threat of accelerated eutrophication to freshwater lakes and reservoirs.

OBJECTIVES

The Survey was designed to develop, in conjunction with state environmental agencies, information on: nutrient sources, concentrations, and impact on selected freshwater lakes as a basis for formulating comprehensive and coordinated national, regional, and state management practices relating to point-source discharge reduction and non-point source pollution abatement in lake watersheds.

ANALYTIC APPROACH

The mathematical and statistical procedures selected for the Survey's eutrophication analysis are based on related concepts that:

a. A generalized representation or model relating sources, concentrations, and impacts can be constructed.

b. By applying measurements of relevant parameters associated with lake degradation, the generalized model can be transformed into an operational representation of a lake, its drainage basin, and related nutrients.

c. With such a transformation, an assessment of the potential for eutrophication control can be made.

LAKE ANALYSIS

In this report, the first stage of evaluation of lake and watershed data collected from the study lake and its drainage basin is documented. The report is formatted to provide state environmental agencies with specific information for basin planning [§303(e)], water quality criteria/standards review [§303(c)], clean lakes [§314(a,b)], and water quality monitoring [§106 and §305(b)] activities mandated by the Federal Water Pollution Control Act Amendments of 1972.

Beyond the single lake analysis, broader based correlations between nutrient concentrations (and loading) and trophic condition are being made to advance the rationale and data base for refinement of nutrient water quality criteria for the Nation's freshwater lakes. Likewise, multivariate evaluations for the relationships between land use, nutrient export, and trophic condition, by lake class or use, are being developed to assist in the formulation of planning guidelines and policies by EPA and to augment plans implementation by the states.

ACKNOWLEDGMENT

The staff of the National Eutrophication Survey (Office of Research & Development, U. S. Environmental Protection Agency) expresses sincere appreciation to the Kansas State Department of Health and Environment for professional involvement, to the Kansas National Guard for conducting the tributary sampling phase of the Survey, and to those Kansas wastewater treatment plant operators who voluntarily provided effluent samples and flow data.

The staff of the Kansas Division of Environmental Health provided invaluable lake documentation and counsel during the Survey, reviewed the preliminary reports, and provided critiques most useful in the preparation of this Working Paper series.

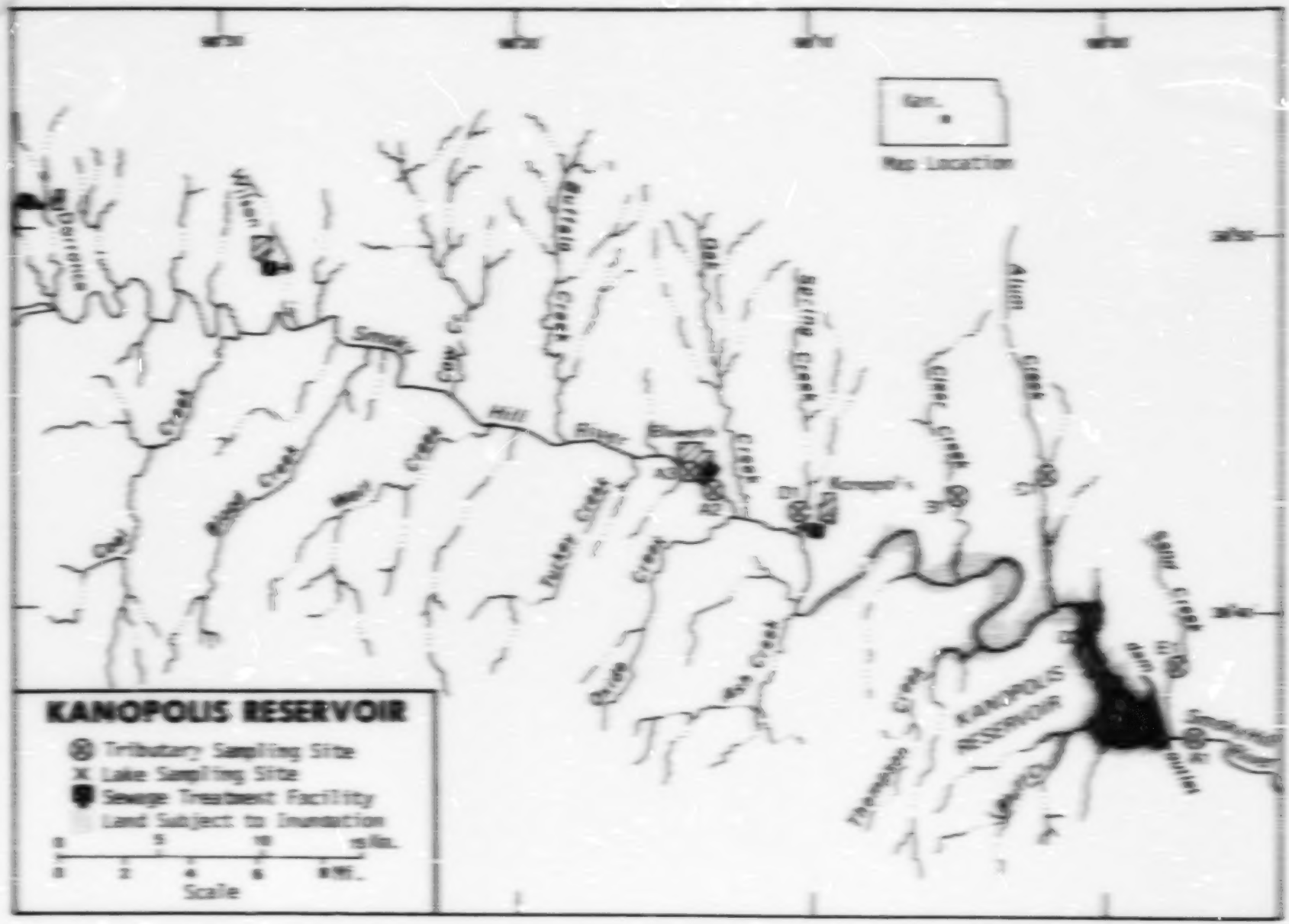
Major General Edward R. Fry, the Adjutant General of Kansas, and Project Officer Colonel Albin L. Lundquist, who directed the volunteer efforts of the Kansas National Guardsmen, are also gratefully acknowledged for their assistance to the Survey.

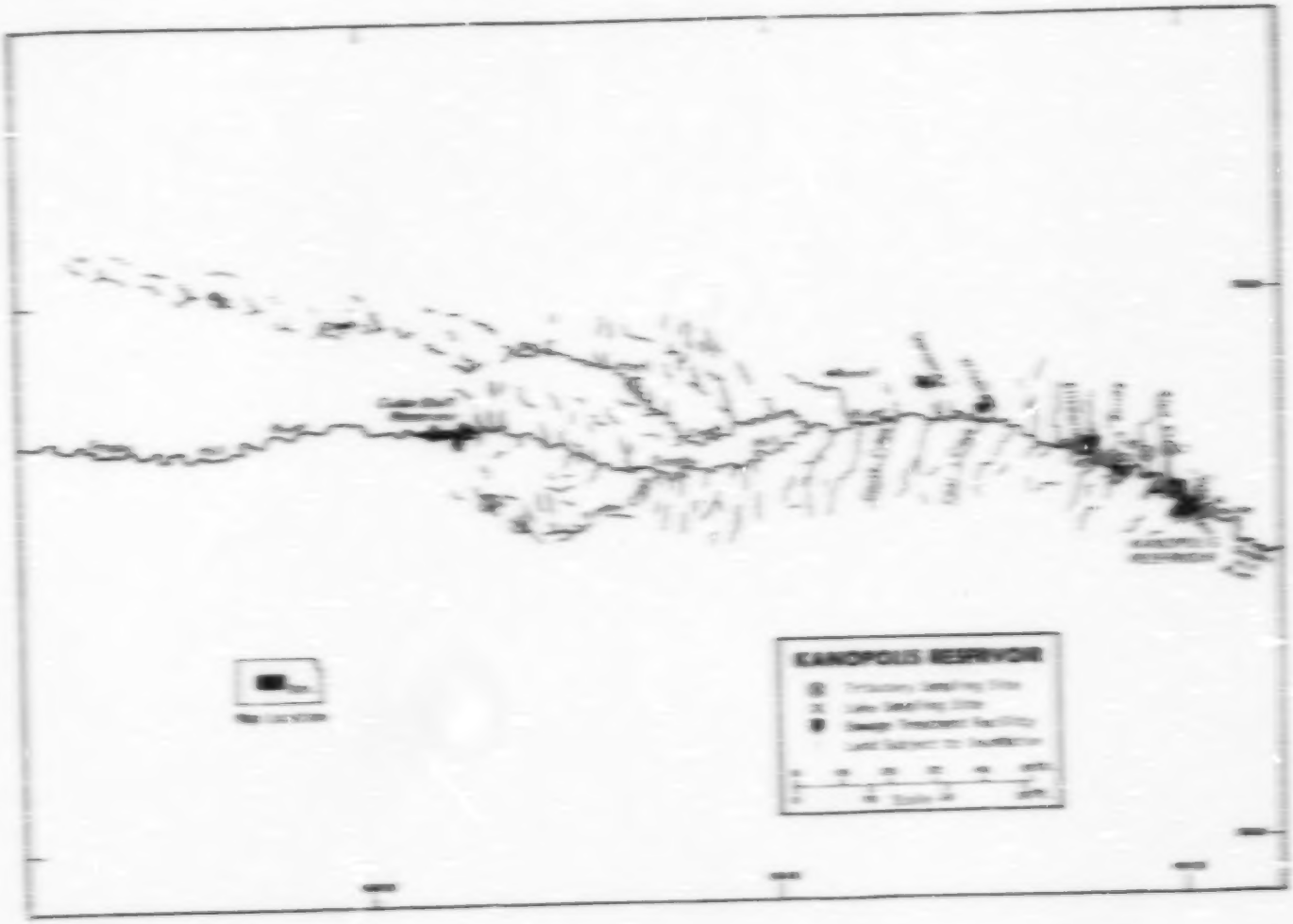
NATIONAL EUTROPHICATION SURVEY

STUDY RESERVOIRS

STATE OF KANSAS

NAME	COUNTY
Cedar Bluff	Trego
Council Grove	Morris
Elk City	Montgomery
Fall River	Greenwood
John Redmond	Coffey, Lyon
Kanopolis	Ellsworth
Marion	Marion
Melvern	Osage
Milford	Clay, Geary
Norton	Norton
Perry	Jefferson
Pomona	Osage
Toronto	Greenwood, Woodson
Tuttle Creek	Marshall, Pottawatomie, Riley
Wilson	Russell


KANOPOLIS RESERVOIR
Tributary Sampling Site
Lake Sampling Site
Sewage Treatment Facility
Land Subject to Inundation
Scale
Map Location
Smoky Hill River
Buffalo Creek
Salt Creek
Elkhorn Creek
Kanopolis Reservoir
Dam
Outlet


KANOPOLIS RESERVOIR

KANOPOLIS RESERVOIR

STORET NO. 2006

I. CONCLUSIONS

A. Trophic Condition:

Survey data indicate Kanopolis Reservoir is potentially eutrophic. However, the reservoir becomes quite turbid during periods of runoff, and primary productivity is intermittently light-limited (Kring, 1977).

This water body ranked tenth in overall trophic quality when the 15 Kansas reservoirs sampled in 1974 were compared using a combination of six parameters*. Eight of the reservoirs had less median total phosphorus, five had less and one had the same median dissolved orthophosphorus, eight had less median inorganic nitrogen, eleven had less mean chlorophyll a, and ten had greater mean Secchi disc transparency.

B. Rate-Limiting Nutrient:

The algal assay results indicate Kanopolis Reservoir was phosphorus limited at the times the samples were taken (04/12/74 and 10/01/74).

The reservoir data indicate phosphorus limitation at all sampling times. However, as noted above primary productivity is light-limited rather than nutrient-limited at times.

* See Appendix A.

C. Nutrient Controllability:

1. Point sources--The total phosphorus inputs of point sources amounted to 5.2% of the total load to Kanopolis Reservoir during the sampling year. The City of Ellsworth contributed 2.7% of the total load; Wilson, 1.2%; Kanopolis, 0.9%; Dorance, 0.4%; and septic tanks serving shoreline dwellings and a recreational area added less than 0.1% of the total.

The present phosphorus loading of 6.65 $g/m^2/yr$ is over nine times that proposed by Vollenweider (Vollenweider and Dillon, 1974), as a eutrophic loading (see page 14). Even complete removal of phosphorus at the point sources would still leave a loading about nine times the eutrophic level, and it does not seem likely that point-source phosphorus control would result in any significant improvement in the trophic condition of the reservoir.

2. Non-point sources--Non-point sources added 94.8% of the total phosphorus load to Kanopolis Reservoir during the sampling year. The Smoky Hill River contributed 91.3% of the total; Clear Creek, 0.4%; Sand Creek, less than 0.1%; and ungaged tributaries, an estimated 2.8%.

The phosphorus export rate of the Smoky Hill River was 4 $kg/km^2/yr$ (see page 13). This rate is considerably higher than the 0.2 kg/km^2 rate of this river at the inlet of Cedar Bluff Reservoir* about 155 kilometers upstream.

* Working Paper No. 511.

It is not known whether the higher export rate of the Smoky Hill River at Kanopolis Reservoir is due to underestimation of the phosphorus load from the known point sources or is due to other point sources in the drainage.

II. RESERVOIR AND DRAINAGE BASIN CHARACTERISTICS[1]

A. Morphometry[11]:

1. Surface area: 14.37 kilometers^2.
2. Mean depth: 4.5 meters.
3. Maximum depth: 17.4 meters.
4. Volume: 64.665 x 10^6 m^3.
5. Fourteen-year median hydraulic retention time: 190 days.

B. Tributary and Outlet:
(See Appendix C for flow data)

1. Tributaries -

Name	Drainage area (km^2)*	Mean flow (m^3/sec)*
Smoky Hill River (A-2)	19,632.2	8.160
Clear Creek	44.5	0.075
Sand Creek	21.8	0.037
Minor tributaries & immediate drainage -	636.7	1.350
Totals	20,335.2	9.622

2. Outlet -

Smoky Hill River	20,349.6**	9.660

C. Precipitation***:

1. Year of sampling: 59.1 centimeters.
2. Mean annual: 66.4 centimeters.

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[1] Table of metric conversions--Appendix B.
[11] Kring, 1977.
* For limits of accuracy, see Working Paper No. 175, "...Survey Methods, 1973-1976".
** Includes area of reservoir.
*** See Working Paper No. 175.

III. WATER QUALITY SUMMARY

Kanopolis Reservoir was sampled three times during the open-water season of 1974 by means of a pontoon-equipped Huey helicopter. Each time, samples for physical and chemical parameters were collected from two or more depths at two stations on the reservoir (see map, page v). During each visit, a single depth-integrated (4.6 m or near bottom to surface) sample was composited from the stations for phytoplankton identification and enumeration; and during the first and last visits, a single 18.9-liter depth-integrated sample was composited for algal assays. Also each time, a depth-integrated sample was collected from each of the stations for chlorophyll a analysis. The maximum depths sampled were 9.1 meters at station 1 and 4.6 meters at station 2.

The sampling results are presented in full in Appendix D and are summarized in the following table.

[illegible]

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
			2 SITES			2 SITES				2 SITES	
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	15.4 - 17.7	16.6	16.6	[illegible]	22.2 - 23.6	22.9	22.9	[illegible]	15.1 - 15.7	15.4	15.4
[illegible]	5.4 - 8.3	6.9	6.9	[illegible]	4.9 - 7.2	5.9	5.9	[illegible]	6.0 - 6.4	6.2	6.2
[illegible]	123. - 139.	131.	131.	[illegible]	[illegible] - 139.	[illegible]	[illegible]	[illegible]	[illegible] - 133.	[illegible]	[illegible]
[illegible]	6.2 - 6.2	6.2	6.2	[illegible]	6.0 - 6.4	6.2	6.2	[illegible]	7.7 - 7.9	7.8	7.8
[illegible]	145. - 195.	145.	145.	[illegible]	132. - 145.	139.	139.	[illegible]	138. - 151.	144.	144.
[illegible]	0.039 - 0.039	0.062	0.059	[illegible]	0.057 - 0.057	0.061	0.060	[illegible]	0.027 - 0.075	0.048	0.035
[illegible]	0.057 - 0.062	0.059	0.057	[illegible]	0.059 - 0.059	0.059	0.059	[illegible]	0.057 - 0.063	0.059	0.059
[illegible]	0.476 - 0.496	0.484	0.479	[illegible]	0.388 - 0.438	0.419	0.408	[illegible]	0.278 - 0.325	0.304	0.304
[illegible]	0.064 - 0.092	0.084	0.080	[illegible]	0.080 - 0.096	0.079	0.079	[illegible]	0.058 - 0.064	0.062	0.070
[illegible]	0.488 - 0.789	0.743	0.765	[illegible]	0.648 - 1.087	0.737	0.788	[illegible]	0.388 - 0.465	0.439	0.439
[illegible]	0.558 - 0.778	0.691	0.648	[illegible]	0.379 - 0.788	0.596	0.646	[illegible]	0.338 - 0.428	0.378	0.375
[illegible]	1.077 - 1.496	1.354	1.378	[illegible]	1.081 - 1.438	1.284	1.295	[illegible]	0.668 - 1.078	0.869	0.858
[illegible]	24.9 - 25.9	25.1	25.1	[illegible]	5.1 - 18.6	5.8	5.8	[illegible]	25.2 - 25.7	25.4	25.4
[illegible]	8.3 - 8.4	8.3	8.3	[illegible]	8.3 - 8.3	8.3	8.3	[illegible]	8.3 - 8.3	8.4	8.4

B. Biological Characteristics:

1. Phytoplankton -

Sampling Date	Dominant Genera	Algal Units per ml
04/12/74	1. Dactyliococcopsis sp.	2,661
	2. Centric diatoms	1,955
	3. Skeletonema sp.	1,260
	4. Chroomonas sp.	738
	5. Chrysophytan cells	652
	Other genera	1,606
	Total	8,774
06/27/74	1. Chlamydomonas sp.	3,393
	2. Chroomonas sp.	664
	3. Zoospores	663
	4. Cyclotella sp.	332
	5. Euglena sp.	250
	Other genera	1,401
	Total	6,601
10/01/74	1. Flagellates	1,410
	2. Stephanodiscus sp.	1,234
	3. Chroomonas sp.	529
	4. Cryptomonas sp.	485
	5. Skeletonema sp.	264
	Other genera	440
	Total	4,362

5. Chlorophyll a -

Sampling Date	Station Number	Chlorophyll a (ug/l)
04/12/74	1	14.8
	2	23.4
06/27/74	1	1.1
	2	10.6
10/01/74	1	10.2
	2	36.1

C. Limiting Nutrient Study:

1. Autoclaved, filtered, and nutrient spiked -

a. April sample -

Spike (mg/l)	Ortho P Conc. (mg/l)	Inorganic N Conc. (mg/l)	Maximum yield (mg/l-dry wt.)
Control	<0.005	0.598	0.1
0.050 P	<0.005	0.598	14.2
0.050 P + 1.0 N	<0.005	1.598	14.4
1.0 N	<0.005	1.598	0.1

b. October sample -

Spike (mg/l)	Ortho P Conc. (mg/l)	Inorganic N Conc. (mg/l)	Maximum yield (mg/l-dry wt.)
Control	0.020	0.362	0.8
0.050 P	0.070	0.362	6.5
0.050 P + 1.0 N	0.070	1.362	7.9
1.0 N	0.020	1.362	0.7

2. Discussion -

The control yields of the assay alga, Selenastrum capricornutum, indicate that the potential primary productivity of Kanopolis Reservoir was low in April and moderate in October. There was a significant growth response in both assays when phosphorus was added but no such response to the addition of only nitrogen. These results indicate phosphorus limitation.

The reservoir data support the assay findings. The mean inorganic nitrogen to orthophosphorus ratios were 85 to 1 in April, 37 to 1 in June, and 41 to 1 in October; and phosphorus limitation would be expected. However, the reservoir is intermittently light-limited rather than nutrient-limited (Kring, 1977).

IV. NUTRIENT LOADINGS
(See Appendix L for data)

For the determination of nutrient loadings, the Kansas National Guard collected monthly near-surface grab samples from each of the tributary sites indicated on the map (page vi), except for the months of June and July when two samples were collected at most of the sites. Sampling was begun in October, 1974, and was completed in September, 1975.

Through an interagency agreement, stream flow estimates for the year of sampling and a "normalized" or average year were provided by the Kansas District Office of the U.S. Geological Survey for the tributary sites nearest the lake.

In this report, nutrient loads for sampled tributaries were calculated using mean annual concentrations and mean annual flows. Nutrient loads shown are those measured minus point-source loads, if any.

Nutrient loads for unsampled "minor tributaries and immediate drainage" ("ZZ" of U.S.G.S.) were estimated using the mean concentrations in Sand Creek at station E-1 and the mean annual ZZ flow.

The operator of the Ellsworth wastewater treatment plant provided monthly effluent samples and corresponding flow data. The operator of the Wilson wastewater treatment plant provided effluent samples but could not provide flow data. Therefore, the nutrient loads for Wilson were estimated at 1.134 P and 3.401 N/capita/year.

The towns of Kanopolis and Durrance did not participate, and nutrient loads from these sources also were estimated at 1.134 P and 3.401 N kg/capita/year.

A. Waste Sources:

1. Known municipal -

Name	Pop. Served	Treatment	Mean Flow (m^3/d)	Receiving Water
Ellsworth*	2,486	act. sludge	860.2†	Smoky Hill R.
Wilson*	974	tr. filter	368.7†	Dry Creek to Smoky Hill R.
Kanopolis**	720	stab. pond	272.5†	Spring Creek
Durrance**	310	stab. pond	117.3†	Trib of Smoky Hill R.

2. Known industrial - None

* Treatment plant questionnaires.
** Anonymous, 1971.
† Estimated at 0.3785 m^3/capita/day.

B. Annual Total Phosphorus Loading - Average Year:

1. Inputs -

Source	kg P/ yr	% of total
a. Tributaries (non-point load) -		
Smokey Hill River	87,305	91.3
Clear Creek	385	0.4
Sand Creek	75	<0.1
b. Minor tributaries & immediate drainage (non-point load) -	2,725	2.8
c. Known municipal STP's -		
Ellsworth	2,595	2.7
Wilson	1,105	1.2
Kanopolis	815	0.9
Dorrance	350	0.4
d. Septic tanks* -	15	<0.1
e. Known industrial - None	-	-
f. Direct precipitation** -	250	0.3
Total	95,620	100.0

2. Outputs -

Reservoir outlet - Smoky Hill River 21,020

3. Net annual P accumulation - 74,600 kg.

* Estimate based on 40 shoreline dwellings and one campground; see Working Paper No. 175.
** See Working Paper No. 175.

C. Annual Total Nitrogen Loading - Average Year:

1. Inputs -

Source	kg N/yr	% of total
a. Tributaries (non-point load) -		
Smoky Hill River	559,815	87.6
Clear Creek	4,035	0.7
Sand Creek	1,175	0.2
b. Minor tributaries & immediate drainage (non-point load) -	42,955	6.7
c. Known municipal STP's -		
Ellsworth	8,385	1.3
Wilson	3,315	0.5
Kanopolis	2,450	0.4
Dorrance	1,065	0.2
d. Septic tanks* -	495	<0.1
e. Known industrial - None	-	-
f. Direct precipitation** -	15,515	2.4
Total	639,195	100.0

2. Outputs -

Reservoir outlet - Smoky Hill River 496,560

3. Net annual N accumulation - 142,635 kg.

D. Non-point Nutrient Export by Subdrainage Area:

Tributary	kg P/km²/yr	kg N/km²/yr
Smoky Hill River (at A-2)	4	89
Clear Creek	9	91
Sand Creek	3	54

* Estimate based on 40 shoreline dwellings and one campground; see Working Paper No. 175.
** See Working Paper No. 175.

E. Mean Nutrient Concentrations in Ungaged Streams:

Tributary	Mean Total P Conc. (mg/l)	Mean Total N Conc. (mg/l)
Alum Creek	0.189	1.615
Spring Creek	0.166	3.528

F. Yearly Loads:

In the following table, the existing phosphorus loadings are compared to those proposed by Vollenweider (Vollenweider and Dillon, 1974). Essentially, his "dangerous" loading is one at which the receiving water would become eutrophic or remain eutrophic; his "permissible" loading is that which would result in the receiving water remaining oligotrophic or becoming oligotrophic if morphometry permitted. A mesotrophic loading would be considered one between "dangerous" and "permissible".

Note that Vollenweider's model may not be applicable to water bodies with short hydraulic retention times.

	Total Phosphorus		Total Nitrogen	
	Total	Accumulated	Total	Accumulated
grams/m^2/yr	6.65	5.19	44.5	9.9

Vollenweider phosphorus loadings ($g/m^2/yr$) based on mean depth and 14-year median hydraulic retention time of Kanopolis Reservoir:

"Dangerous" (eutrophic loading)	0.72
"Permissible" (oligotrophic loading)	0.36

V. LITERATURE REVIEWED

Kring, R. Lynn, 1977. Personal communication (reservoir morphometry and hydraulic retention time). KS Dept. of Health & Environment, Topeka.

Vollenweider, R. A., and P. J. Dillon, 1974. The application of the phosphorus loading concept to eutrophication research. Natl. Res. Council of Canada Publ. No. 13690, Canada Centre for Inland Waters, Burlington, Ontario.

VI. APPENDICES

APPENDIX A

LAKE RANKINGS

LAKE DATA TO BE USED IN REMARKS

LAKE CODE	LAKE NAME	MEDIAN TOTAL P	MEDIAN INORG N	500- MEAN SEC	MEAN CHLPHA	15- MEAN SD	MEDIAN BIOS (MPN) P
2001	CEDAR BLUFF RESERVOIR	0.017	0.055	431.667	4.217	10.800	0.054
2002	COUNCIL GROVE	0.064	0.038	495.286	9.789	10.400	0.029
2003	ELK CITY	0.038	0.598	491.400	3.212	14.800	0.053
2004	FALL RIVER RESERVOIR	0.053	0.470	486.667	7.683	9.200	0.016
2005	JOHN REDMOND RESERVOIR	0.116	1.250	492.667	9.467	8.240	0.090
2006	KINGMAN RESERVOIR	0.075	0.640	487.000	16.933	10.200	0.011
2007	MARION RESERVOIR	0.052	0.438	483.667	12.400	9.000	0.010
2008	MELVERN RESERVOIR	0.063	0.295	498.111	38.400	14.400	0.007
2009	MILFORD RESERVOIR	0.074	0.716	488.333	10.867	12.800	0.013
2010	NORTON RESERVOIR	0.122	0.110	478.750	21.360	8.800	0.013
2011	PERRY RESERVOIR	0.055	0.470	478.571	5.614	13.400	0.017
2012	POMONA RESERVOIR	0.048	1.240	481.333	8.312	13.000	0.021
2013	TOHONTO RESERVOIR	0.067	0.425	486.500	9.583	13.000	0.011
2014	TUTTLE CREEK RESERVOIR	0.102	0.670	478.667	11.270	13.600	0.067
2015	WILSON RESERVOIR	0.021	0.295	485.222	8.867	13.400	0.034

LAKES RANKED BY INDEX NO.

RANK	LAKE CODE	LAKE NAME	INDEX NO.
1	2801	[illegible]	536
2	2815	[illegible]	435
3	2807	[illegible]	357
4	2803	[illegible]	358
5	2804	[illegible]	329
6	2809	[illegible]	326
7	2813	[illegible]	303
8	2810	[illegible]	292
9	2811	[illegible]	276
10	2804	[illegible]	271
11	2812	[illegible]	267
12	2802	[illegible]	238
13	2805	[illegible]	214
14	2805	[illegible]	194
15	2814	[illegible]	139

PERCENT OF LAKES <07> HIGHER VALUES (NUMBER OF LAKES <07> HIGHER VALUES)

LAKE CODE	LAKE NAME	<EDUA TOTAL P	<EDUA INORG N	SUB- <EDU SEC	<EDU CHLOPA	15- <EDU 10	<EDUA DISS INTHO P	INDEX NO
2001	CEDAR BLUFF RESERVOIR	100 (144)	100 (144)	101 (144)	93 (133)	57 (81)	89 (127)	539
2002	COUNCIL GROVE	29 (41)	29 (41)	36 (51)	43 (61)	64 (91)	29 (41)	238
2003	ELK CITY	85 (121)	58 (75)	7 (11)	100 (144)	7 (11)	100 (144)	358
2004	FALL RIVER RESERVOIR	57 (81)	57 (81)	14 (21)	71 (101)	79 (113)	58 (75)	329
2005	JOHN REDMOND RESERVOIR	14 (21)	8 (11)	8 (11)	58 (75)	93 (133)	7 (11)	184
2006	KANOPOLIS RESERVOIR	43 (61)	43 (51)	29 (41)	21 (31)	71 (101)	64 (91)	271
2007	MARION RESERVOIR	64 (91)	64 (91)	43 (61)	29 (41)	86 (123)	71 (101)	357
2008	MELVERN RESERVOIR	79 (113)	82 (111)	86 (123)	8 (11)	8 (11)	79 (113)	326
2009	MILFORD RESERVOIR	21 (31)	36 (51)	79 (113)	14 (21)	58 (75)	14 (21)	214
2010	NORTON RESERVOIR	7 (11)	93 (133)	64 (91)	7 (11)	100 (144)	21 (31)	292
2011	PERRY RESERVOIR	58 (75)	18 (25)	57 (81)	86 (123)	25 (31)	43 (61)	279
2012	POMONA RESERVOIR	71 (101)	7 (11)	58 (75)	64 (91)	36 (51)	36 (51)	267
2013	TORONTO RESERVOIR	36 (51)	71 (101)	21 (31)	79 (113)	36 (51)	57 (81)	301
2014	TUTTLE CREEK RESERVOIR	8 (11)	18 (25)	71 (101)	36 (51)	14 (21)	8 (11)	139
2015	WILSON RESERVOIR	93 (133)	82 (111)	93 (133)	57 (81)	25 (31)	89 (127)	439

APPENDIX B

CONVERSION FACTORS

CONVERSION FACTORS

Hectares x 2.471 = acres

Kilometers x 0.6214 = miles

Meters x 3.281 = feet

Cubic meters x 8.107×10^{-4} = acre/feet

Square kilometers x 0.3861 = square miles

Cubic meters/sec x 35.315 = cubic feet/sec

Centimeters x 0.3937 = inches

Kilograms x 2.205 = pounds

Kilograms/square kilometer x 5.711 = lbs/square mile

APPENDIX C

TRIBUTARY FLOW DATA

APPENDIX D

PHYSICAL and CHEMICAL DATA

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APPENDIX I

TRIBUTARY AND WASTEWATER TREATMENT PLANT DATA

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7547813	14	12		0.354	1.468	0.260	0.027	0.040
7547918	13	45		0.472	1.388	0.358	0.111	0.138
7547915	11	35		0.340	0.488	0.455	0.095	0.118
7548084	14	45		0.465	1.280	0.184	0.128	0.138
7548324	04	38		0.736	1.488	0.825	0.059	0.110
7548432	13	39		0.897	1.338	1.116	0.135	0.088
7548487	15	46		0.715	1.756	4.879	0.165	0.428
7548621	15	15		0.810	1.488	0.875	0.145	0.440
7548718	14	35		0.810	1.388	0.855	0.875	0.256
7548738	14	04		0.388	1.482	0.256	0.895	0.488
7548834	12	48		0.458	1.458	0.838	0.148	0.480
7548428	16	58		0.115	1.488	0.835	0.865	0.196

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